

**Assignment 7**  
(Due February 28, 2008)

**Reading:** (*from Reed*) §4.3

**Problems:** §4.1: #2, 3, 5, 9, 10, 12

**Additional Problem:** Prove that if a function is continuous on the open interval  $(a, b)$  and bounded on  $[a, b]$ , then it is Riemann integrable on  $[a, b]$ . (*Hint:* Let  $f$  be the function. Prove that for any  $\epsilon > 0$  there is a partition  $P$  of  $[a, b]$  such that

$$U_P(f) - L_P(f) \leq \epsilon$$

Use your experience with #2, §3.3 to control the potential problems near the endpoints.) Conclude that the function  $f$ , defined on  $[0, 1]$  by  $f(x) = \sin(1/x)$  for  $x \in (0, 1]$  and  $f(0) = 7$ , is Riemann integrable on  $[0, 1]$ .